

### **AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions and listings of claims in the application.

### **LISTING OF CLAIMS**

1. (Original) A dry pump comprising a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, and means for effecting axial movement of the rotors within the stator to vary at least one clearance between the rotors and the stator during use of the pump.
2. (Currently Amended) TheA pump according to Cclaim 1; wherein the means for effecting axial movement of the rotors is configured to effect axial movement of the rotors in response to an axial load generated in the rotors during operation of the pump.
3. (Currently Amended) TheA pump according to Cclaim 2; wherein each rotor is mounted on, ~~or integral with,~~ a respective shaft rotatably mounted within the pump.
4. (Currently Amended) TheA pump according to Cclaim 3; comprising a bearing assembly for rotatably supporting the shafts relative to the stator, and wherein the means for effecting axial movement of the rotors ~~being~~is configured to move the bearing assembly relative to the stator.
5. (Currently Amended) TheA pump according to Cclaim 4; wherein the bearing assembly is free to move in an axial direction within a housing, and the means for effecting axial movement of the rotors ~~comprising~~ing a spring mechanism arranged with respect to a rotor such that when the rotor is subjected to an axial load, the spring mechanism compresses or extends causing an axial reactive load, ~~whereby so as~~ to vary an axial position of the rotor over time.

6. (Currently Amended) ~~The~~A pump according to ~~Claim~~ 5; wherein the spring mechanism comprises a setting spring positioned in the housing between the bearing assembly and an end surface of the housing.
7. (Currently Amended) ~~The~~A pump according to ~~Claim~~ 5 ~~or Claim 6~~, wherein the housing is a cylindrical housing having an end surface extending radially inwardly toward the rotor.
8. (Currently Amended) ~~The~~A pump according to ~~any of Claims 5 to 7~~, wherein the spring mechanism is selected such that the maximum axial load to which a rotor is ~~likely to~~ be subjected does not exceed the elastic limit of the spring mechanism.
9. (Currently Amended) ~~The~~A pump according to ~~Claim~~ 1; comprising control means for actively controlling operation of the means for effecting axial movement of the rotors.
10. (Currently Amended) ~~The~~A pump according to ~~Claim~~ 9; wherein the means for effecting axial movement of the rotors comprises an actuator, and the control means ~~being~~ is configured to control actuation of the actuator and thereby control the axial position of the rotors.
11. (Currently Amended) ~~The~~A pump according to ~~Claim~~ 10; wherein each rotor is mounted on, ~~or integral with~~, a respective shaft rotatably mounted within the pump, the actuator being configured to axially move the shafts ~~and thereby~~ so as to effect axial movement of the rotors.
12. (Currently Amended) ~~The~~A pump according to ~~Claim~~ 10 ~~or Claim 11~~, wherein the means for effecting axial movement of the rotors comprises a motor for rotating a drive shaft engaging the actuator, and the control means ~~being~~ is configured to control operation of the motor so as to axially move the actuator relative to the stator with rotation of the drive shaft.
13. (Currently Amended) ~~The~~A pump according to ~~Claim~~ 12; wherein the drive shaft comprises a lead screw passing through a conformingly-threaded aperture in the actuator.

14. (Currently Amended) TheA pump according to ~~any of C~~claims 11 to 13, further comprising a bearing assembly for rotatably supporting the shafts relative to the stator, the actuator being configured to move the bearing assembly relative to the stator.
15. (Currently Amended) TheA pump according to ~~C~~claim 14, wherein the actuator comprises part of a housing for the bearing assembly.
16. (Currently Amended) TheA pump according to ~~C~~claim 15, wherein the housing includes an internal pump sealing mechanism.
17. (Currently Amended) TheA pump according to ~~C~~claim 15 ~~or Claim 16~~, wherein the housing defines an end surface of the stator.
18. (Currently Amended) TheA pump according to ~~any of C~~claims 14 to 17, wherein the bearing assembly supports one end of each of the rotors, and further comprising a second bearing assembly ~~being provided for supporting the other a second~~ end of each of the rotors.
19. (Currently Amended) TheA pump according to ~~C~~claim 18, wherein the second bearing assembly is arranged to move axially with axial movement of the rotors.
20. (Currently Amended) TheA pump according to ~~C~~claim 19, wherein a housing of the second bearing assembly includes an internal pump sealing mechanism.
21. (Currently Amended) TheA pump according to ~~C~~claim 19 ~~or Claim 20~~, wherein a housing of the second bearing assembly defines an end surface of the stator.
22. (Currently Amended) TheA pump according to ~~any of C~~claims 9 to 21, wherein the control means comprises means for detecting the value of an operational parameter of the pump, and is configured to control the means for effecting axial movement of the rotors in response to the detected value of the operational parameter.

23. (Currently Amended) TheA pump according to Cclaim 22, wherein the operational parameter comprises one of the temperature of the stator, the temperature within the stator, backpressure, the power consumption of the pump and the pressure at the inlet of the pump.

24. (Currently Amended) TheA pump according to ~~any of C~~claims 9 ~~to 23~~, wherein the control means comprises a sensor for detecting the size of the clearance between the rotors and the stator, and is configured to control the means for effecting axial movement of the rotors in response to the detected size of the clearance.

25. (Currently Amended) TheA pump according to ~~any of C~~claims 9 ~~to 23~~, wherein the control means comprises a sensor for detecting the rate of change of the clearance between the rotors and the stator, and is configured to control the means for effecting axial movement of the rotors in response to the detected rate.

26. (Currently Amended) TheA pump according to Cclaim 24 ~~or Claim 25~~, wherein the sensor comprises a Hall effect sensor.

27. (Currently Amended) TheA pump according to ~~any of C~~claims 9 ~~to 26~~, wherein the control means is configured to control the means for effecting axial movement of the rotors to sequentially increase and decrease the size of the clearance during use of the pump.

28. (Currently Amended) TheA pump according to ~~any of C~~claims 9 ~~to 27~~, wherein the control means is configured to control operation of the means for effecting axial movement of the rotors such that the rate of increase of the size of the clearance is different to the rate of decrease of the size of the clearance.

29. (Currently Amended) TheA pump according to ~~any preceding~~ claim 1, wherein at least part of each rotor has an outer diameter that tapers decreasingly in a direction from a pump inlet to a pump outlet.

30. (Currently Amended) TheA pump according to Cclaim 29, wherein only part of each rotor has an outer diameter that tapers towards the pump outlet.

31. (Currently Amended) TheA pump according to ~~any preceding claim 1~~, wherein the rotors have a Roots profile.
32. (Currently Amended) TheA pump according to ~~any of Claims 1 to 30~~, wherein the rotors have a Northey profile.
33. (Currently Amended) TheA pump according to ~~any of Claims 1 to 30~~, wherein the rotors are externally threaded rotors.
34. (Currently Amended) A method of controlling operation of a pump comprising a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, the method comprising the steps of axially moving the rotors relative to the stator to increase an axial clearance between the rotors and the stator when rotors are stationary, ~~subsequently starting rotor rotation, and, during rotor rotation,~~ axially moving the rotors relative to the stator during rotor rotation to decrease the axial clearance between the rotors and the stator.
35. (Currently Amended) TheA method according to ~~Claim 34~~, further comprising the steps of ~~subsequently~~ increasing and decreasing the axial clearance during use of the pump to remove deposits from the axial clearance.
36. (Currently Amended) TheA method according to ~~Claim 35~~, wherein the axial clearance is periodically increased and decreased during use of the pump.
37. (original) A method of controlling operation of a pump comprising a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, the method comprising the steps of sequentially axially moving the rotors in opposite directions relative to the stator to periodically vary an axial clearance between the rotors and the stator to remove deposits from the axial clearance.
38. (New) The pump according to claim 25 wherein the sensor comprises a Hall effect sensor.